

Top Cladding Layer 11

Core 10a

Core 10b

Bottom Cladding Layer 12

Si Substrate 13

FIG. 1
(Prior Art)

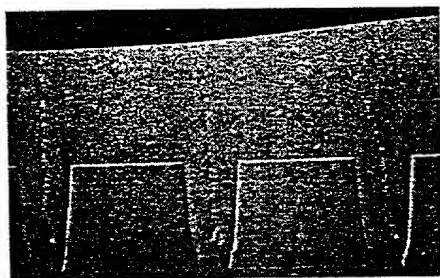


Fig 2 (a) BPSG 2um gap
(print out)

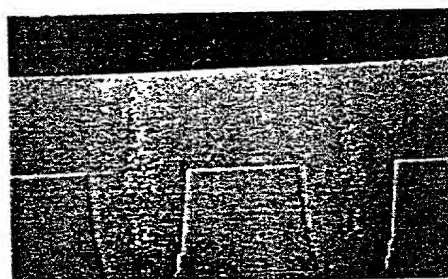


Fig 2 (b) BPSG 4um gap
(print out)

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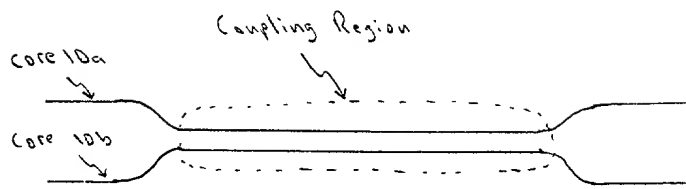


Fig. 3

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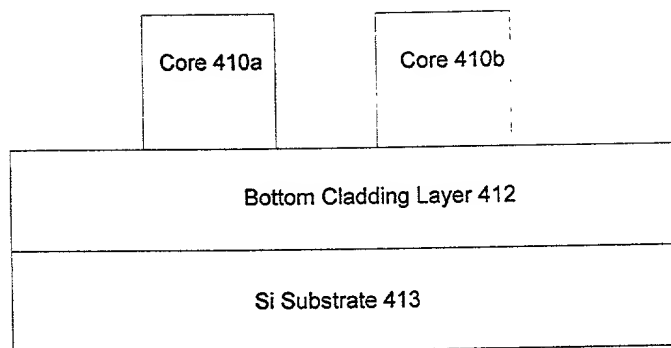


FIG. 4

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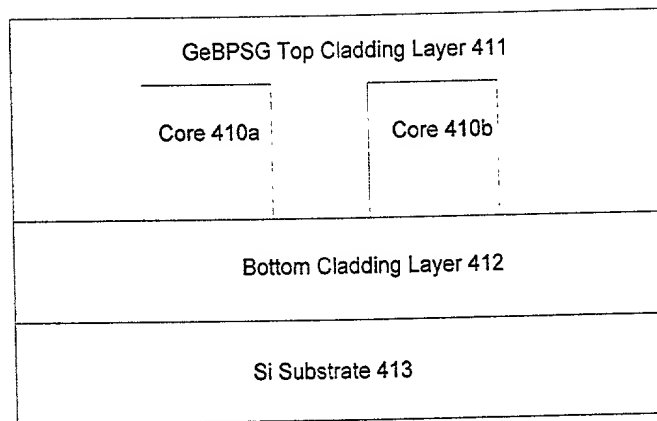
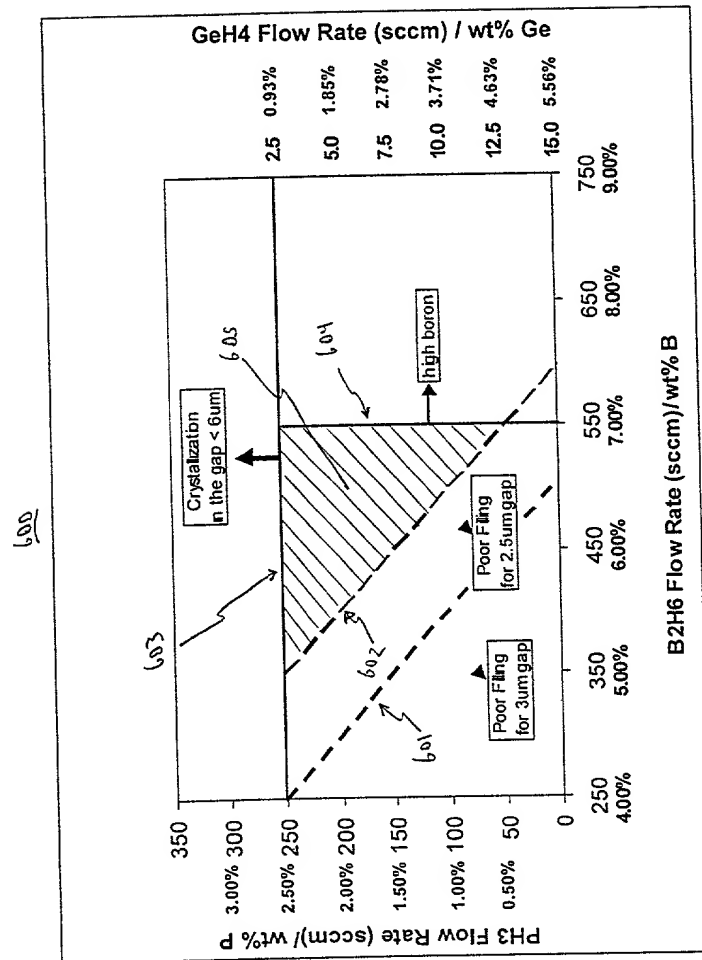


FIG. 5



GeBPSG Doping Window

FIG. 6

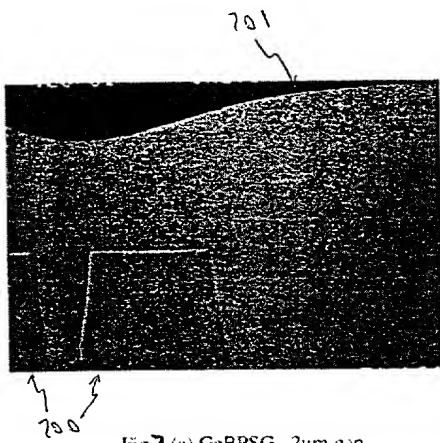


Fig 7 (a) GeBPSG 2um gap

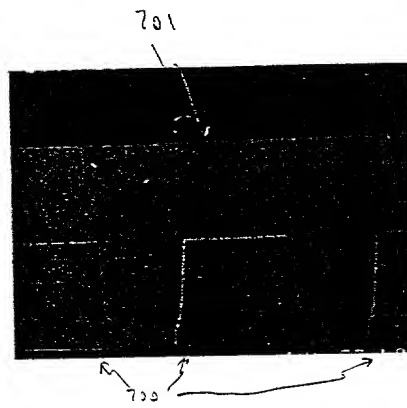
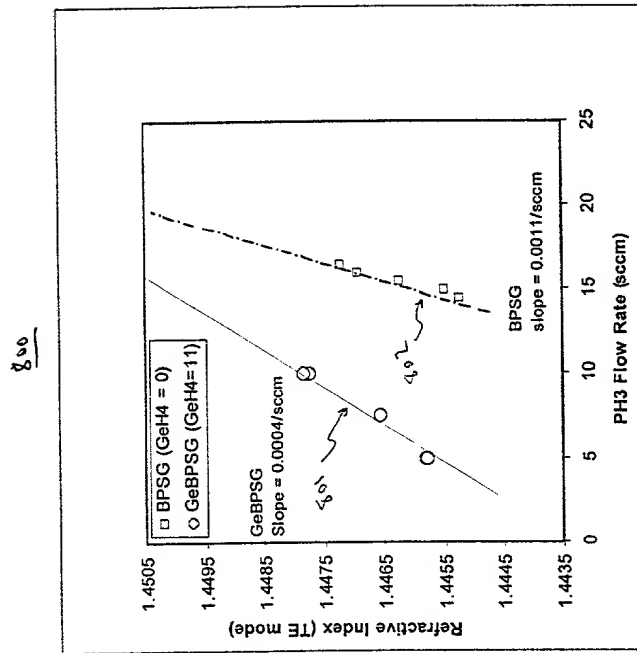


Fig 7 (b) GeBPSG 4um gap



Sensitivity of refractive index to PH₃ flow (GeBPSG vs. BPSG)

FIG. 8

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900

Prepare a plurality of waveguide cores on a bottom cladding layer on a semiconductor substrate

901

Add doping gases (e.g. Ge dopant, P dopant, and B dopant) with SiH₄ and N₂O in a PECVD system

902

Control the ratio of the doping gases to form a GeBPSG top cladding layer having precisely controlled ratios of P dopant, Ge dopant, and B dopant

903

Perform a thermal anneal process with a temperature in a range of 950C to 1050C on the top cladding layer

904

Fig. 9